



US 20180298794A1

(19) **United States**(12) **Patent Application Publication**
McCarthy, JR. et al.(10) **Pub. No.: US 2018/0298794 A1**(43) **Pub. Date: Oct. 18, 2018**(54) **CYLINDER DEACTIVATION CONTROL AND METHODS***F02D 13/02* (2006.01)*F02D 41/00* (2006.01)*F02D 41/22* (2006.01)(71) Applicant: **EATON INTELLIGENT POWER LIMITED, DUBLIN (IE)**(52) **U.S. Cl.**CPC *F01L 13/0005* (2013.01); *F02D 13/06* (2013.01); *F02D 13/0215* (2013.01); *F02D 2041/0012* (2013.01); *F02D 41/22* (2013.01); *F01L 2013/001* (2013.01); *F02D 41/0087* (2013.01)(72) Inventors: **James E. McCarthy, JR., KALAMAZOO, MI (US); Douglas J. Nielsen, Marshall, MI (US); Christian Cousin, Cape Coral, FL (US)**(73) Assignee: **EATON INTELLIGENT POWER LIMITED, DUBLIN (IE)**

(57)

ABSTRACT(21) Appl. No.: **15/935,530**(22) Filed: **Mar. 26, 2018****Related U.S. Application Data**

(63) Continuation of application No. PCT/US2016/053590, filed on Sep. 23, 2016.

(60) Provisional application No. 62/233,294, filed on Sep. 25, 2015, provisional application No. 62/280,678, filed on Jan. 19, 2016, provisional application No. 62/397,796, filed on Sep. 21, 2016.

Publication Classification(51) **Int. Cl.***F01L 13/00* (2006.01)*F02D 13/06* (2006.01)

A friction loss management system for an engine, comprises a combustion engine comprising a crankshaft and a plurality of cylinders, a reciprocating piston assembly connected to the crankshaft, a fuel injector connected to an injection controller, an intake valve connected to an intake valve controller, and an exhaust valve connected to an exhaust valve controller. A control unit comprises at least one set of control algorithms configured to receive engine power demand data, and determine a number of cylinders of the plurality of cylinders for deactivation based on the received engine power demand data and further based on sensed or stored friction values for the plurality of cylinders. Determining the number of cylinders of for deactivation minimizes friction between the plurality of cylinders and their respective reciprocating piston assembly by selecting a cylinder combination of active cylinders and deactivated cylinders with the lowest total friction while meeting engine power demand.

